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Journal of Advanced Laboratory Research in Biology

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e-ISSN 0976-7614

Volume 3, Issue 3, July 2012

Research Article

The Effects of Cultural Medium and Cultivars on Some Qualitative Characteristic of Cucumber Transplant (*Cucumis sativus*)

Elaheh Mirabi* and Mahmud Hasanabadi

**Applied Agricultural Science Education Center of Shahrood, Shahrood, Iran.*

Abstract: Cucumber produced by transplanting cause to seed saving, reduce the risk of cold, pest and disease control. In order to investigate the effects of cultural medium and cultivars on characteristic of cucumber transplants, an experiment was conducted based on a randomized complete design with 5 replications at the Applied Science in Agricultural Education Center Shahrood (Iran) during 2011. Treatments included 6 levels of cultural medium (a1= 50% peat + 25% coco peat + 25% sand, a2= 50% peat + 25% coco peat + 25% + 25% vermicompost, a3= 50% peat + 25% coco peat + 25% perlit, a4= 50% coco peat + 25% peat+25% sand, a5= 50% coco peat + 25% peat + 25% vermicompost, a6= 50% coco peat + 25% peat + 25% perlit) and 2 types of cultivars (Vilmorin and Royal, 24189). The results indicated that the effects of substrate were significant in all of treats (leaf area, stem diameter, height of transplant, root dry weight, shoot dry weight, root wet weight, and shoot wet weight). A2 and A5 have better performance than others in all of treats. There is not any significant effect between cultivars and an interaction between substrate and cultivar wasn't significant.

Keywords: Cucumber, Media, Cultivar, Transplant.

1. Introduction

The cucumber is a one-year-old plant and is among the pumpkin family, which has a scientific name *Cucumis sativus.* The transplant is a little herb which spends part of its growth in an appropriate environment and controlled and will be transmitted to the main field after favorable environment characteristic.

Transplanting is called the transmission of this little herb to the main field (20). Among the most important reasons for transplanting included saving the seed uses, earlier browning of the crops, better control of pesticides and disease and selecting the best and the healthiest plant for growing (11). Today because of the economics of this action, the transplanting action has been preferred for planning a lot of different vegetables. One of the ways of producing transplant is planting without soil which is completely a new method. Because of some advantage including controlling the soil feed, the possibility of increasing the soil accumulation, increasing the appearance of diseases and pesticide and increasing the quantity and quality of the crop that the soil planting resulted in the increased use of the garden product producers (18). It seems that among different plants without any soil-plant in the granular crops is the best alternative for producing such product including cucumber and pumpkin (13). In this method, the organic and mineral beds have been used for producing the plants. The used material characteristic as the plant bed, the direct and indirect effects on growing and the plant growth is clear, and choosing the suitable and appropriate bed is one of the main reasons of production success in planting without any soil (15). The ability of a bed according to the wet protection and appropriate air supplying to the bush (4). Peat is one of the used beds in the garden, which results in improving the plant growth, and increasing the disease and also decreasing the environmental stresses (12). But today because of the extractable peat source

*Corresponding author:
E-mail: elahe.mirabi@yahoo.com.

decrease, the application of the other organic materials which can be replaced by then increase too (18,19).

Vermicompost is one of the materials which today have an extensive application for the bed plant in gardening. This material is a composition which changes into a material like humus, which is product as a result of the earthworm on the organic materials (6). Overall vermicompost is a kind of bio organic manure, which results in improving the physical structure of the bed, increasing enzyme activities, increasing the number of microorganisms and also the soil hyomic (17).

The organic matter decomposition by the earthworm in a kind of overheating phenomena and having a kind of organic and microbial variety than the normal heating phenomena had put a value on vermicompost uses (7). Coco peat is another uses bed in gardening that is product of the coconut fiber recently because of the organic soil decrease especially peat, coco peats are used as the beds in the garden but coco peat have some poisonous natural elements which is a hamper for the plant growth, so because of these results the coco peat has been used as a mixture of some other organic materials. This material has a good porosity and results in the seed growth and root.

Sand is one of the most famous plant environments which lack any nutritional elements and its value is as a result of enough porosity, oxygen existence, and wet attainment. Perlit also has a broad and extensive use in gardening and have a volcanic origin. It is white and lacks any nutritional element. Because of the water save, the value of this material is 4 as much as its own weight. In the Arnako *et al*., a great amount of vermicompost uses on the tomato and cucumber transplant in the plant environment without any soil, results in a significant increase in the transplant growth. Bachman *et al*., (3) investigated the effect of vermicompost in the pepper and tomato transplant and reported that vermicompost results in the root production in the tomato but had no significant effect on the sweet pepper. Atiye *et al*., pointed out that replacing the planting environment with 5 and 10 percent vermicompost in contrast with the control group resulted in the wet tomato weight increase.

Ioden and Tors (10) with comparing the bedrock, perlit, carbonized rice and the coconut reported the more tomato transplant performance in the perlit bed.

This research with the aim of comparing the effect of some organic material and element as the bed plant, on the transplant production characteristic two cultivars of cucumber was investigated.

2. Materials and Methods

In order to investigate the effects of cultural medium and cultivars on characteristic of cucumber transplants, an experiment was conducted based on a randomized complete design with 5 replications at the Applied Science in Agricultural Education Center of Shahrood (Iran) during 2011. The experimental treatments including two varieties of commercial trade named Vilmorin and Royal 24189, and also the plant bed including:

Bed(1): Peat 50%, coco peat 25%, sand 25%;
Bed (2): Peat 50%, coco peat 25%, vermicompost 25%;
Bed (3): Peat 50%, coco peat 25%, perlit 25%;
Bed (4): coco peat 50%, peat 25%, sand 25%;
Bed (5): coco peat 50%, peat 25%, vermicompost 25%;
Bed (6): coco peat 50%, peat 25%, perlit 25%.

At first, the plant bed was mixed with the content and the plant trail filled with the beds. Then put the seeds on the beds and covered with a light surface of the peat. Seed watering has been done every other day and after 3 weeks in the 3 leaf level, the transplants put out of the bed and the characteristics including: the transplant leaf surface (with a special tool for measuring the leaf surface) the wet and dry weight of the shoot and root (with a scale) and the transplant height (with a ruler) was measured. Analysis and drawing have been done with the Excel and mini tab software. Comparing the means with the use of MSTAT-C software and LSD test in the possible 5 surface has been investigated.

3. Result and Discussion

According to the mentioned results of the estimated analysis data, showed that the simple effect of the bed in all of the characteristics of the measurements was meaning full. The effect of variety and also the mutual effect and the bed was not meaningful in all of the characteristics (Table 1).

Table 1. The analysis of the mean-variance the root of the bed effects and variety on the cucumber transplant characteristics.

The change Source	Degree of freedom	Leaf area (cm^2)	The wet root weight	The wet stem weight	The dry root weight	The dry shoot weight	The transplant length
Media	5	93.927 **	0.375**	5.635**	0.008**	0.013**	**8.022****
Cultivar	1	1.09 ns	0.005ns	0.002 ns	0.003 ns	0.001 ns	**0.760 ns**
Media* cultivar	5	1.282 ns	0.011 ns	0.043 ns	0.004 ns	0.0003 ns	**0.357 ns**
Error	108	0.799	0.005	0.114	0.001073	0.001	**0.2142**

** Meaningful in the possible surface of percent; * meaningful in the possible element 5 percent; ns without any significant effect.

3.1 The transplant leaf area

The bed effect on the transplant leaf area in the possible surface of 1 percent was meaningful. The most leaf bed in the second bed (peat 50%, coco peat 25%, vermicompost 25%) and the least leaf surface of the first bed (peat 50%, coco peat 25%, sand 25%) has been seen (Fig. 1) between the second and fifth (coco peat 50%, peat 25%, vermicompost 25%) there was not a significant difference from the statistic point of view.

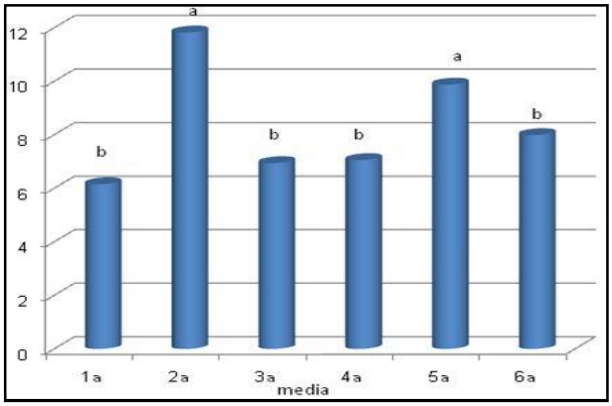

Fig. 1. The bed effect on the transplant leaf surface (cm^2).
The averages which are equal to nearly one character according to the LSD test in the possible surface were not meaningful.

Atieh and Coworkers (2) pointed out that vermicompost can result in the leaf surface increase because of having enough nutrition and the absorption capability. They know the leaf surface increase because of the microorganism activity and pointed out that the microorganism with having the ability in producing the regulated growth material can result in the leaf surface increase.

3.2 The transplant height

The effect of the bed on the transplant height on the possible surface of the percent was meaningful ($p \leq 0/01$). The most transplant height has been seen in the fifth bed. There was not a significant difference between the second and fifth bed. The least height in the six beds has been seen (coco peat 50%, peat 25% and perlit 25%) (Fig. 2).

Kasno *et al*., (5) know the reason for the height increase with the vermicompost uses, and the earthworm activity, which results in the increase of the homos organic element, the increase of the microorganism population and consequently the increase of the humic acid attendance in the soil. Moscolo *et al*., (14) knows the reason for the height increase in the humic acid attendance of the auxin, cytokinin and gibberellin increase production. Among the positive effects of the nitrate in the plant growth is the increase of the plant diameter.

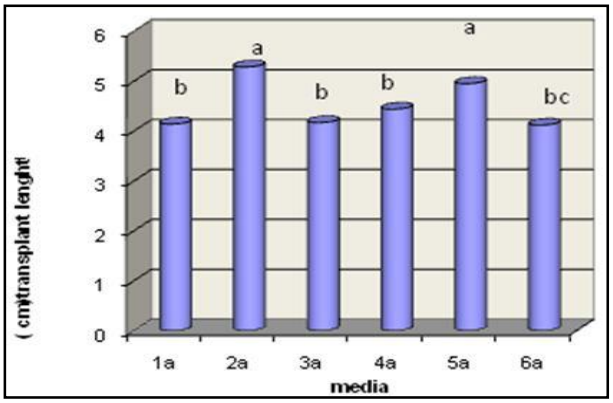

Fig. 2. The bed effect in the bed height.
The averages which are the same in one character according to the LSD test in the possible surface were not meaningful.

3.3 The wet shoot weight

The results showed that the effect of media on wet shoot weight was significant. The highest weight was observed in fifth media and the lowest weight was observed in sixth media. Vermicompost cause to increase leaf area and photosynthesis and cause to increase growth of the shoot (Fig. 3).

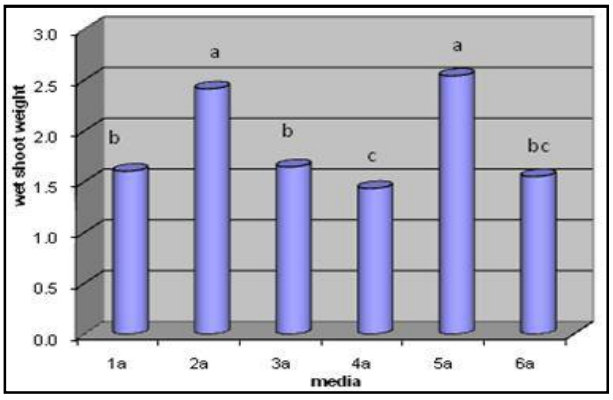

Fig. 3. The effect of media on wet shoot weight.
The average which is the same in at least one character according to the test LSD in the possible of 5 percent was not significant.

3.4 The dry shoot weight

Comparing the treatment average in the dry shoot weight shows that the second bed (peat 50 percent, coco peat 25 percent, vermicompost 25 percent) and fifth bed (coco peat 50 percent, peat 25 percent, vermicompost 25 percent) includes the heights dry shoot weight and in this way they have significant differences with other beds in the possible surface of 1 percent. The other beds had no significant differences with each other.

Because the hormone production is affected by the nutritious food, so vermicompost according to the high nutrition can result in the growth stimulus hormones increase and consequently will result in the dry amount material increase (16).

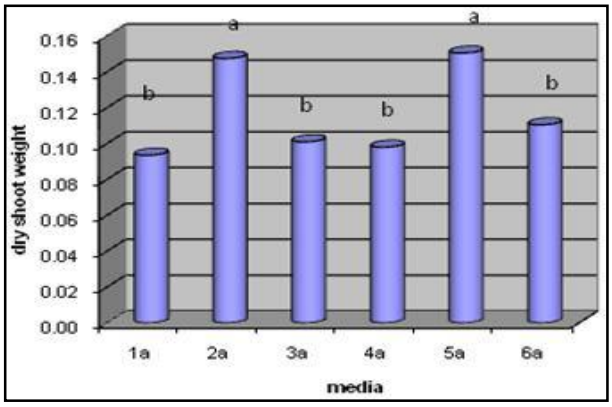

Fig. 4. The bed effect on the dry weight of the shoot.
The average which has similarity at least in one character according to the LSD test in the possible surface of 5 percent was not meaningful.

3.5 The wet root weight

The effect of the plant bed on the root the wet weight in the possible surface of 1 percent was meaningful. The wet weight in the second bed (peat 50 percent, coco peat 25 percent, vermicompost 25 percent) and the least wet root weight in the first bed (peat 50 percent, coco peat 25 percent, sand 25 percent) has been seen (Fig. 5).

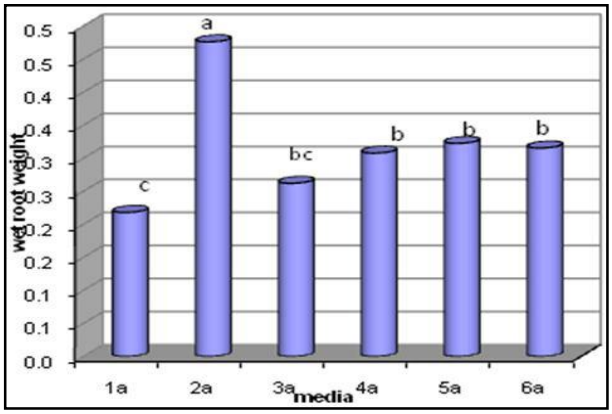

Fig. 5. The bed effect on the wet weight of the root.
The averages which have the same character according to the LSD test in the possible surface of 5 percent were not meaningful.

3.6 The root dry weight

The bed effect on the root dry weight on the possible surface of 1 percent was meaningful. The root dry weight in the second bed was higher and with the fifth bed has significant difference. The significant difference between the better surface (the second and fifth bed) is probably because of the more peat percent than the coco peat that the higher peat amount in combination with vermicompost, resulted in the dry root weight increase. Tesoy (16) stated that according to the indirect production of the indoleacetic acid (auxin), on the effect on zinc, and considering that vermicompost is a rich environment of nutrition, so can result in the root growth increase with the effect in the hormone production and the dry material increase. Overall, the cocopeat attendance according to the appropriate porosity results in the better root system improvement and consequently results in the dry material increase (4). So, in the beds containing vermicompost and coco peat the amount of the dry material weight increase.

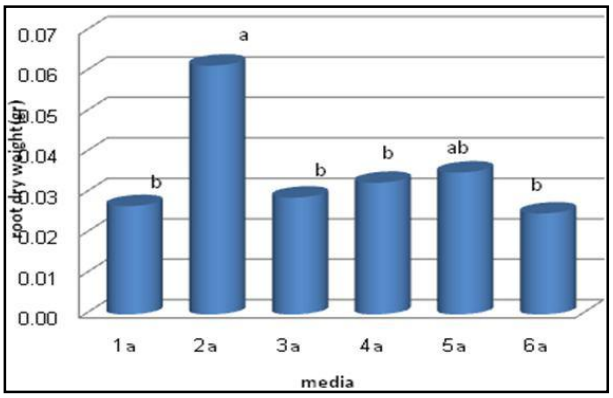

Fig. 6. The effect of the bed on the dry root weight.
The average which is the same in at least one character according to the test LSD in the possible of 5 percent was not significant.

Regarding the low capability of the pumpkin family for planting, the better system improvement can cause in the transplant capability improvement than the wet stress (1). Also, the transplant capability to the stresses after the transition had the direct connection with the transplant dry material amount and consequently will result in the better settlement of the transplant in the soil (15). The result of this research shows that using coco peat and vermicompost as the transplant plant bed according to the physical and chemical characteristics of the environment, improved the transplant growth, and consequently results in the improved plant's ability than the transplanting activity.

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